



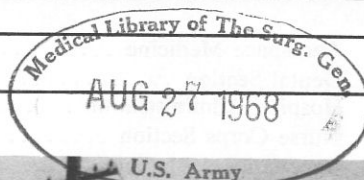
# UNITED STATES NAVY

## Medical News Letter

Vol. 52

Friday, 19 July 1968

No. 2



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*United States Navy*  
**MEDICAL NEWS LETTER**

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**FRONT COVER: NAVAL MEDICAL NEUROPSYCHIATRIC RESEARCH UNIT.** This research facility was established 1 June 1959 in San Diego, California to conduct research in the field of neuropsychiatry as that specialty applies to the naval service. To carry out this mission NMNRU has studied intensively the effects of fatigue, sleep deprivation, and abnormal work-rest cycles on job performance. These studies are part of a 6-year research program relating to fatigue among helicopter pilots and in connection with the SEALAB II Research and Development Project. The Unit has also begun this country's first intensive study at the South Pole Station of man's physiological adjustment to the confining and harsh environment of the Antarctic, in order to improve the effectiveness of the Navy's program for psychiatric screening of candidates for duty in that area. This is supported by the National Science Foundation and Veterans Administration. Another study of health changes aboard naval vessels is now underway. One aim of this effort is to evaluate a technique by which illness may be anticipated. In addition, the scientists at the Unit's newly refurbished laboratory are involved in a research project the purpose of which is to describe the characteristics of naval personnel who are admitted to the psychiatric sick list. Ineffectiveness associated with emotional difficulty continues to be a major source of personnel loss in the Navy and Marine Corps. To meet this situation data are being collected on all male personnel admitted to any of the psychiatric services. Of particular interest in this group are those who returned to full duty without medical recommendation for administrative action. These people will be carefully followed during their subsequent naval careers in order to develop criteria upon which to base a judgment as to whether or not a man should be returned to full duty from the psychiatric sick list. These and other studies are helping to extend the nation's awareness and effectiveness in the field of naval neuropsychiatry.

The issuance of this publication approved by the Secretary of the Navy on 4 May 1964.

## THE SYSTEMIC MYCOSES IN DIFFERENTIAL DIAGNOSIS OF CHRONIC PULMONARY DISEASE \*

N. A. Saliba, MD, FCCP,\*\* Louisville, Kentucky,  
*Dis Chest* 53(1):73-78, January 1968.

In some countries, tuberculosis is no longer recognized as a major hazard to health and as a result, a quasi-complacent attitude is often encountered—and yet throughout the world millions of people contract the disease and die each year. It undoubtedly remains a serious threat and adequate control must be our first goal. We have not achieved this.

On this background the systemic mycoses with pulmonary involvement are receiving increasing attention in recent years. Some of the diseases such as aspergillosis and candidiasis have been well documented in the past, usually as secondary infections. A variety of pulmonary mycoses capable of causing serious pathology are now recognized such as actinomycosis, aspergillosis, blastomycosis, candidiasis, coccidioidomycosis, cryptococcosis, histoplasmosis, mucormycosis, nocardiosis, South American blastomycosis, sporotrichosis and others.

Many cases of histoplasmosis, blastomycosis and coccidioidomycosis have been reported on the American continent in the last few years. Endemic areas are present in the United States, the Ohio-Mississippi Valley region being endemic for histoplasmosis and blastomycosis. However, histoplasmosis is by no means confined to the American continent because the geographic distribution already comprises over 30 countries, but isolations have been sporadic in many of these areas.

Histoplasmosis and blastomycosis can be confused with other diseases, particularly tuberculosis and carcinoma. Figure 1 (omitted) shows two cases almost identical, one with cavitory tuberculosis and the other with cavitory histoplasmosis; Figure 2 (omitted) is an example of two men with left hilar masses consistent with a radiologic diagnosis of possible carcinoma. These patients had negative com-

plement fixation tests and negative skin tests for fungi. At thoracotomy, both cases were suspect for carcinoma grossly, but tissue stains confirmed the diagnosis of blastomycosis. Investigation has shown that in the United States, a substantial number of patients in tuberculosis hospitals probably had histoplasmosis instead of tuberculosis. A high degree of awareness on the part of physicians is essential for diagnosis as these diseases could easily elude recognition because of their similarities.

An accurate diagnosis is of utmost importance, and one must mention the following reasons in particular.

1. To employ specific antifungal therapy.
2. To avoid placing the label of "tuberculosis" (or other pathology) on patients with a mycotic infection. If these patients are hospitalized for tuberculosis, they are obviously highly exposed to it, unless otherwise protected.
3. In an established case of tuberculosis, one of the mycoses can also coexist in an active form—in this case treatment of tuberculosis alone would obviously be inadequate and would "appear" to fail.
4. Thoracotomy and biopsy in the unsuspected case of fungus infection can sometimes result in serious complications. Protective antifungal treatment whenever possible would be indicated.

The following cases will briefly illustrate these points.

### Case 1

A 52-year-old man had bilateral pulmonary cavitary disease initially considered of tuberculous origin. The complement fixation and skin sensitivity tests were positive for histoplasmosis. Sputum was negative for acid-fast bacilli, but positive for *Histoplasma capsulatum* on culture.

### Case 2

A 53-year-old man had cavitory disease in the left lung and sputum positive for acid-fast bacilli by

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Presented at the IX International Congress on Diseases of the Chest, Copenhagen, August 20-25, 1966.  
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smear and culture. However, following a routine positive complement fixation test for histoplasmosis, further sputum examinations confirmed the presence of associated histoplasmal infection. He was treated with antituberculosis chemotherapy as well as amphotericin-B and his sputum converted to negative for both organisms. He refused to accept resectional surgery. Subsequently the histoplasmosis relapsed on three occasions with positive sputum cultures but no evidence of relapse of tuberculosis was found. He developed superior vena caval obstruction and died five and one-half years following the initial diagnosis.

#### Case 3

A 54-year-old man was admitted with miliary tuberculosis confirmed by positive sputum cultures. He was showing response to chemotherapy within the first month, but developed a new cavity in the left lower lung field. This was considered an unusual development in this type of case. Further sputum studies at this point confirmed the association of blastomycosis by culture. His complement fixation and skin tests were negative. He continued with antituberculosis chemotherapy, as well as amphotericin-B and made a satisfactory recovery from both diseases. The last follow-up was October, 1966, when he was well and working.

#### Case 4

A 54-year-old man was admitted from another hospital following a lung biopsy for suspected carcinoma. He developed a bronchopleural fistula with empyema and his sputum as well as his pleural fluid on admission to our hospital were positive for histoplasmosis, by culture. He responded satisfactorily to amphotericin-B treatment intravenously and small doses intrapleurally.

In this category, we must also consider the urgent need for diagnosis in an emergency situation, at least to enable a therapeutic trial pending detailed investigation.

#### Case 5

A 24-year-old woman was transferred from another hospital critically ill with a possible diagnosis of miliary tuberculosis by chest x-ray film and a liver biopsy. The complement fixation and skin tests were negative. She received intensive therapy, but progressed downhill rapidly and expired after five days. The result of a bone marrow examination became available the day after she died and was positive for histoplasmosis. The onset of her illness was 21 days prior to her death. In this interval successive

chest x-ray examinations showed rapid progression of miliary lesions throughout both lung fields. At postmortem examination there was evidence of extensive histoplasmosis involving the lungs, liver, spleen, lymph nodes and adrenal glands.

#### Diagnosis

The diagnostic aids available to the physician are several:

1. *History and examination*—The symptomatology is often not contributory. An occupational history, the presence of hepatosplenomegaly or surface lesions may be helpful in at least considering the possibility of fungus disease.

2. *X-ray films*—These occasionally point to the diagnosis such as in the case of the air crescent in aspergillomas or the Mulberry type calcification of histoplasmosis. However, quite often chest x-ray films are not contributory to the specific diagnosis. For example, cavitary disease can be found in a large variety of pulmonary disorders.

3. *Skin testing*—Specific skin sensitivity is present in many of these patients, particularly for histoplasmosis. The significance is similar to that applied in tuberculosis, i.e., a positive skin test is indicative of previous infection, not necessarily active disease. Likewise, a negative skin test may occasionally be found in the presence of active disease.

4. *Blood*—Complement fixation studies are a useful indicator and are usually positive. A positive result is highly suggestive although not always indicative of active fungal disease. A blood culture and bone marrow examinations can be helpful in the acute form of the disease.

5. *Sputum*—Isolation and identification of the organism by culture is the ultimate confirmation of a diagnosis. A times this procedure is difficult and time-consuming.

6. *Body fluids*—Culture of pleural fluid, gastric secretions, cerebrospinal fluid, etc. can sometimes be useful.

7. *Animal inoculation* particularly in cases of repeated contamination of cultures is another form of identification.

8. *Tissue studies*—This is an important and sometimes the only means of diagnosis. Tissue stains or cultures of biopsy or resected surgical specimens should be widely used in patients coming to surgery with an uncertain diagnosis.

#### Discussion

In areas where some of these diseases are prevalent (e.g. histoplasmosis, blastomycosis, coccidio-



idomycosis), routine screening procedures in medical centers with skin testing and complement fixation tests are well worthwhile. One need only remember that in some 5-10 percent of active cases, one or both of these tests may be negative, as has been demonstrated in some of the previous examples.

Current treatment with amphotericin-B is far from perfect, but can produce beneficial results in several types of systemic mycoses. Surgery is resorted to in highly selected cases.

The following example will briefly illustrate some of the results one might anticipate even in advanced cases.

#### Case 6

A 59-year-old Caucasian was admitted critically ill on September 8, 1964. Chest x-ray films revealed extensive chronic bilateral pulmonary disease. His complement fixation test was 1:256 for histoplasmosis mycelial and yeast phase antigens, negative for blastomycosis. Histoplasmin skin test was positive, tuberculin test, negative. Numerous sputum examinations were negative for acid-fast bacilli, but subsequent cultures were found positive for *Histoplasma capsulatum*, the last being October, 1964. Following this, all studies have remained negative. Bone marrow biopsy was also negative.

The electrocardiogram was within normal limits. Vital capacity was 65 percent of predicted. Arterial  $pO_2$  was 60 mm Hg at rest, falling to 44 mm Hg following exercise. Residual volume was 44 percent of the total lung volume.

He was started on intravenous amphotericin-B and received a total dose of 2,925 mg in a period of about five months. He was also placed on isoniazid. At the same time, various laboratory procedures were monitored such as liver function studies, blood urea nitrogen, electrolytes, blood sugar, complete blood count and urinalysis. These were repeated at two to four-week intervals during treatment and after treatment. He made a remarkable improvement clinically and radiologically, with prompt sputum conversion.

He has since received two other short courses of amphotericin-B (570 mg each) in an effort to minimize the risk of reactivation and the severity of pulmonary sequelae. This is a study currently in progress at this hospital on some of these patients. He was doing well when last seen on November 22, 1966.

In conclusion, one needs to re-emphasize that many of these mycoses are no longer uncommon. Some of these diseases are self-limiting, others can be very acute ending rapidly in death. More frequently the course is chronic and progressive, terminating in disability or death if the patient is not diagnosed early enough. Thus, an increased awareness of the possibility of these problems is likely to be rewarding.

#### Summary

Tuberculosis control is yet to be achieved, and at the same time, fungus diseases are playing a greater role in chronic respiratory disease.

Some of the important systemic mycoses with pulmonary involvement are mentioned, and particular reference is made to histoplasmosis and blastomycosis. These are endemic in the Ohio-Mississippi region of the United States and many cases have been reported in the last few years. These can at times present serious diagnostic problems, and can simulate tuberculosis or carcinoma.

Specific examples of some of these problems are given including cases of pulmonary tuberculosis with histoplasmosis, tuberculosis with blastomycosis, exploratory thoracotomy in pulmonary histoplasmosis being complicated by histoplasmosis empyema.

The importance of accurate diagnoses is re-emphasized, and the various procedures outlined. Increased awareness is essential as treatment can be beneficial in many of these patients.

(The omitted figures and references may be seen in the original article.)

# NONUNION OF THE SHAFTS OF THE LONG BONES

## A REVIEW AND ANALYSIS OF 140 CASES

James L. ZumBrunnen, MD and Hanes H. Brindley, MD,  
*JAMA* 203(9):637-640, February 26, 1968.

A survey and an analysis of 140 nonunions of the shafts of long bones revealed that 104 (85 percent) of 123 surgically treated bones united when these four conditions were met: (1) accurate apposition of fragments, (2) adequate immobilization, (3) healthy soft tissue with sufficient blood supply surrounding the site of nonunion, and (4) stimulation of osteogenesis. Factors such as the type and extent of the original injury and initial treatment profoundly influenced the outcome of the nonunited fractures, but ultimate union depended upon restoration of the natural mechanisms of bone repair.

Failure of the long bones to unite following fracture has remained under formal orthopedic consideration for the past 60 years. The topic has continued to be timely because many of the factors predisposing to nonunion are related to the severe trauma which is inflicted by our mechanized society. To reflect experience with this problem in three hospitals in Temple, Tex., during a 20-year period (1945 to 1965), the clinical records of 120 patients, pertinent roentgenograms, and therapeutic results accompanying 140 nonunions of the shafts of long bones have been reviewed and analyzed. The series included 65 patients: 51 males and 14 females, aged 15 to 72 years, treated at the Scott and White Memorial Hospital; 48 males aged 18 to 55 years seen at the Veterans Administration Hospital; and 7 men, aged 28 to 62 years, observed at the Gulf, Colo., and Santa Fe Hospital.

### Statistics

Certain characteristics of fractures which are often associated with nonunion of the shafts of the long bones were observed in this series of patients. Motor vehicle accidents produced the traumatic injuries which resulted in 37 of the nonunions. Ten of the 120 patients had multiple fractures, and six of them had two bones which failed to unite. Whereas roentgenograms of 16 nonunited tibias and eight non-

united femurs showed severe comminution, the other long bones were not comminuted so frequently. Thirteen of the fractures in the forearm and only six in the femur were open, either initially or because of open reduction. The middle and distal thirds of the long bone shafts harbored 95 of the nonunions.

Nonunion of a shaft of a long bone usually occurs during the most productive years of the patient's life, and may cause nearly total disability (particularly in the laboring man) for two or more years. In the Scott and White group, the age and sex survey (valid in the Scott and White group only) revealed that 51 of the 65 nonunions occurred in males. The youngest patient was 15 years old and the oldest was 72. Ninety percent of these patients with nonunion of the tibia and femur were men; the precipitating fractures occurred with equal frequency during the third, fourth, and fifth decades. Sixty percent of the patients with fractures which resulted in nonunion of both bones of the forearm were women whose ages ranged from 50 to 70 years. Six men and six women had fractures of the humerus which failed to unite, the precipitating trauma usually occurring during the fifth and sixth decades.

### Methods and Results

Preoperative preparation of joints and soft tissues is important in the management of nonunion of the shaft of a long bone; measures such as pedicle skin grafts (after excision of damaged skin and scar tissue), mobilization of joints, and exercise of muscles should be accomplished. There are four necessary criteria to effect union: (1) apposition of the fragments, (2) adequate immobilization, (3) healthy soft tissue with sufficient blood supply surrounding the site of nonunion, and (4) stimulation of osteogenesis. If the operation which will meet these criteria most closely is meticulously performed, union should result in most instances. Even infection, the most serious deterrent to success, can be managed in 80 percent of the cases.

In this series, 146 surgical procedures were performed on 123 of the 140 long bones which had failed to unite (Table 1). One fracture of the tibia united during the period of skin grafting, sauceriza-

From the Department of Orthopedic Surgery, Scott and White Clinic, and from the Scott and White Memorial Hospital and the Scott, Sherwood, and Brindley Foundation, Temple, Tex.  
Read before the Section on Orthopedic Surgery at the 116th annual convention of the American Medical Association, Atlantic City, NJ, June 20, 1967.  
Reprint requests to 2401 S 31st St, Temple, Tex. (Dr. Brindley).

tion, and sequestrectomy. The union was attributed to improvement of circulation, stimulation of osteogenesis, and the passage of time. Surgery was not indicated or was refused in eight instances. (Only three of the nine patients with nonunion of the clavicle had sufficient discomfort or disability to indicate surgical intervention.) When first observed, nine of the patients had undergone multiple surgical procedures, and severe complications made amputation the operation of choice. These cases were not evaluated therapeutically.

One type of bone graft cannot be considered superior to another because each nonunion must be treated individually. Each patient has inherent problems of immobilization and specific requirements for osteogenesis and for apposition of bone fragments. Union was obtained in an average of 5.5 months in 104 (85 percent, ranging from 67 percent in the humerus to 89 percent in the ulna) of the 123 bones which were treated (Table 2). The cortical onlay graft was employed most frequently (72 times). This graft was used in 21 of the 26 operations performed for nonunion of both bones of the forearm. The donor sites for the cortical onlay grafts were tibial cortical bone and outer table iliac bone. The tibia usually was the donor site for nonunited fractures of the forearm. The features of easy accessibility, leaving the normal extremity undisturbed, and early revascularization favored the outer table iliac bone for grafting in mechanically suitable cases. Because of deficiencies in external immobilizations, additional internal fixation was used frequently in the femur and in the humerus.

The iliac cancellous graft with internal fixation was valuable in the tibia and in the femur. Also, this graft was used for supplementary bone when the

Table 1.—Nonunion of Shafts of Long Bones (140 Cases)

	No. of Bones	Total
Surgical treatment		123
Bone grafting procedures, skin grafting, saucerization, sequestrectomy	122*	
1		
Nonsurgical treatment		8
Clavicular nonunion surgery (not indicated)	6	
Surgery refused (patient had nonunion of both bones of forearm with satisfactory function)	2	
Amputation (initial procedure of choice)		9
Total		140

\* Twenty bones were grafted twice, three were grafted for the third time (145 grafting procedures).

Table 2.—Nonunion of Shafts of Long Bones (145 Bone Grafting Operations)

Site	Grafting Procedures					Results		
	Cortical Onlay	Cancellous	Phemister	Intramedullary	Local	Union	Failure	Lost to Follow-up
Tibia	20	6	12	3	11	41	4	1
Femur	6	9	3	0	4	13	3	0
Forearm (14; both bones)	21	3	0	2		20	2	2
Radius	8	2		4		10	1	1
Ulna	6	3		1		6	1	0
Humerus	9	1	1	2	3	8	3	1
Clavicle	2	1				3	0	0
Fibula	0				2	2	0	0
Total	72	25	16	12	20	103	14	5

ilium was employed as the donor site for the outer table grafts.

In instances of nonunion, the surrounding tissues are the main source of blood supply, and disruption of normal structures should be minimal. For example, when a nonunited tibia is in good alignment, the graft described by Phemister may provide satisfactory therapy without stripping the bone and injuring the periosteum and attached muscles. This graft, applied in a number of ways, was used most frequently for nonunion of the tibia (12 times); tibial cortical, iliac cancellous, fibular cortical, and local bone was used.

The intramedullary graft was selected for two patients with nonunion of the humerus, three with nonunion in the tibia, two with nonunion of both bones of the forearm, four with nonunion of the radius, and one with nonunion of the ulna. The distal portion of the ulna was used as an intramedullary graft in the four patients with nonunion in the distal one fourth of the radius.

Local bone obtained from the site of nonunion was used as a graft in 20 instances, 11 of which were nonunions of the tibia. In these patients, rigid internal fixation of the fragments was accomplished. One patient with nonunion of the proximal third of the tibia and one with nonunion of the midshaft of the femur had dual plates applied successfully. For one patient, a single plate was applied for nonunion of the midshaft of the femur. These three patients were treated during 1965, and a trend toward rigid internal fixation with its concomitant advantages is reflected.

Infection in the site of nonunion frequently can be controlled by meticulously performed saucerization and sequestrectomy, and antibiotic therapy. These techniques must be performed in an exacting manner to allow excision of all scar and nonviable tissue and obliteration of the dead space. In this series, ten nonunions were associated with infection. Seven of



the bones united and drainage ceased, but two tibias and one femur were amputated because of the severe infection. One grafted tibia became infected, but the patient failed to report for subsequent observation.

Twenty of the nonunited bones required second operations. Six of these failed to unite; union was attempted for the third time in three, with failure in two. Hence, five of the 14 therapeutic failures occurred in the bones which required more than one grafting procedure.

One patient with nonunion of the femur (with intramedullary nail fixation) has had persistent, painless pseudarthrosis for ten years. Another patient who had intramedullary nail fixation for the femur had pseudarthrosis and has suffered persistent pain and difficulty. Four other bones failed to unite, but additional surgical procedures were not desired by the patients.

## Comment

Although factors such as the type and extent of the original injury and initial treatment may profoundly influence the outcome of nonunion of the shaft of a long bone, ultimate union depends upon restoration of the natural mechanisms of bone repair. Subsequent treatment must meet the criteria of accurate apposition of fragments, adequate immobilization, healthy soft tissue with sufficient blood supply surrounding the site of nonunion, and stimulation of osteogenesis. This survey and analysis of 140 nonunions revealed that 104 (85 percent) of the 123 surgically treated shafts of the long bones united when these criteria were met.

(The omitted figures and references may be seen in the original article.)

## ADDISON'S DISEASE: ETIOLOGY AND RELATIONSHIP TO OTHER ENDOCRINE DISORDERS

*Albert B. Eisenstein, MD,\* Med Clin N Amer 52(2):327-338, March 1968.*

Knowledge of adrenocortical function and hormone synthesis has increased greatly since Hench, Slocumb, Polley and Kendall discovered the remarkable therapeutic effects of cortisone in 1948. Understanding of the pathophysiology of adrenocortical diseases has also been considerably advanced, so that these disorders can be readily diagnosed and effectively treated. Significant new information concerning the etiology and pathogenesis of certain adrenal disorders, especially Addison's disease, has likewise been obtained. The term Addison's disease is used to indicate chronic insufficiency of steroid hormone secretion by the adrenal cortex which results from pathological processes in the gland. Atrophy of the adrenal cortex induced by exogenous steroid administration is excluded from the diagnostic classification, as is adrenocortical insufficiency which follows bilateral adrenalectomy. Acute adrenal insufficiency of the Waterhouse-Friderichsen type will likewise not be included in the discussion. Neither the diagnosis of Addison's disease nor its treatment are to be considered, since several authoritative discussions of these subjects have appeared recently.

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## Infections of the Adrenal Gland

### Tuberculosis

Prior to 1950, adrenal tuberculosis was considered to be the primary cause of Addison's disease. The frequency of tuberculous destruction of the adrenals in patients with Addison's disease ranged from 70 to 88 percent according to various reports. Guttman presented a series of 566 cases of Addison's disease, of which 403 were autopsied. Tuberculosis of the adrenal glands was the most common lesion found and was present in 70 percent. The second most frequent cause of Addison's disease was atrophy of the adrenals (16 percent). In a necropsy study of 28 patients with Addison's disease reported by Barker in 1929, there were 25 with bilateral tuberculosis and 3 with advanced atrophy of the adrenal glands. Acid-fast bacilli were demonstrated on histological examination of adrenal sections in 11 of the 25 with tuberculosis.

When infected with tuberculosis, the adrenal gland is enlarged, firm and nodular. The capsule is thickened and frequently adherent to surrounding tissues. Most often, the substance of the gland is completely replaced by semiconfluent caseous

nodules, which vary in size from a few millimeters to 2 or 3 centimeters in diameter. Occasionally, a thin rim of normal adrenal tissue may be seen beneath the capsule, or a portion of intact medulla or cortex may be present at one pole of the gland. Microscopically, the gland is seen to be replaced by large masses of caseous material. Usually these areas are walled off by a thin zone of connective tissue. Other portions of the gland demonstrate a tissue reaction with epithelioid cell formation, lymphocytic and fibroblastic infiltration and the presence of numerous giant cells. Not infrequently, there is complete destruction of the medulla, whereas portions of cortical tissue appear unaffected. This observation has led to the view that the adrenal medulla is less resistant to infection than is the cortex. Barker carried out careful examination of the adrenals by studying multiple secretions of each gland in 24 patients with tuberculous Addison's disease. Remnants of intact cortical tissue, which Barker estimated to comprise less than 5 percent of the normal amount, were present uniformly; however, in only 1 of the 24 was medullary tissue seen. Studies of the early effects of tuberculosis on the adrenal conducted by Barker revealed that the lesions were found rather consistently at two sites: either in the medulla at a distance from the main suprarenal vein or in the inner half of the cortex. It is believed that the process spreads centrifugally from these initial sites, with early destruction of the medulla and much later involvement of outer cortical layers.

The importance of tuberculosis as an etiological factor in Addison's disease appears to have diminished during recent years. In 1948, Friedman found that primary atrophy was responsible for 60 percent of the cases of Addison's disease that he investigated, whereas tuberculosis caused 40 percent. Forsham recently estimated that in the United States, half the cases of Addison's disease were due to tuberculosis or some fungus infection and that a vast majority of the remainder were due to primary atrophy. Frawley believes that atrophy now accounts for at least 50 percent of the cases of Addison's disease. Among the factors which must contribute to the declining frequency of tuberculosis of the adrenals are the decreased incidence of tuberculosis and the remarkable advances in treatment of the disease.

#### Fungus Infections

Involvement of the adrenal glands occurs in various fungus diseases, and there is occasionally enough tissue destruction to cause adrenal cortical insufficiency. While the frequency of Addison's disease as

a result of fungal infections is small compared to the number that are due to tuberculosis or idiopathic atrophy, it is important to recognize such patients, since proper treatment may be life-saving.

**Histoplasmosis.**—Although the adrenal glands are among the organs most frequently involved by histoplasmosis, the number of patients reported with Addison's disease due to this infection is small. In 1956, Crispell reviewed 103 cases of histoplasmosis, of which 68 had been autopsied and adrenal involvement detected in 36. Of the 36 with histoplasmosis of the adrenal glands, 15 had clinical symptoms that were suggestive of adrenal insufficiency. Four additional cases of Addison's disease associated with proven histoplasmosis were reported by Crispell. Three of these were diagnosed during life and effectively treated, while the fourth was recognized at autopsy. One patient with known histoplasmosis who had no previous signs of adrenal insufficiency developed an acute addisonian crisis.

Histoplasmosis produces caseous destruction of the adrenals, and *Histoplasma capsulatum* can be detected by culture and histologic examination. The development of adrenal insufficiency depends on the quantity of cortical tissue destroyed; it is estimated that at least 90 percent of the adrenal cortex must be lost before Addison's disease is manifest.

**North American Blastomycosis.**—North American blastomycosis is a chronic infectious process caused by *Blastomyces dermatitidis* and characterized by suppurative skin lesions. Sometimes there is systemic spread, with lesions in subcutaneous tissue, bone, lung, genitourinary tract, central nervous systems and, occasionally, the adrenal gland. Kent and Collier estimated that adrenal involvement occurs in about 10 percent of the cases, although only three clinical examples of Addison's disease due to North American blastomycosis had been reported before these investigators described a single case. This variety of blastomycosis produces inflammation and necrosis of the adrenal gland, changes which are thought to be due to the large numbers of organisms present in the tissue and to the occlusion of small blood vessels by fungus cells. Kent and Collier speculated that the reasons so few cases of adrenal blastomycosis have been described during life are that (1) patients may die before the adrenals are completely destroyed, (2) over 90 percent of the adrenal cortex must be involved by the disease before Addison's disease will become manifest, and (3) the primary disorder (blastomycosis) may mask the symptoms of adrenal insufficiency. All the case reports make it evident that blastomycosis was pres-

ent for many years before Addison's disease developed.

**South American Blastomycosis (Paracoccidioidomycosis).**—South American blastomycosis is a chronic granulomatous disease characterized clinically by mucocutaneous and systemic manifestations. It is particularly prevalent among South and Central American male farm workers and is thought to be acquired from the soil and from plants. The fungus enters the body through mucous membranes and spreads via blood and lymphatics. The adrenal glands are involved by South American blastomycosis in about 50 percent of the cases and sometimes represent the only organ affected. Caseation necrosis is the major pathological alteration in the adrenal which results from paracoccidioidal infection. As is the case with North American blastomycosis, the large fungus cells form emboli and produce a vasculitis in adrenal blood vessels, thus leading to ischemic necrosis of glandular tissue.

Del Negro et al. reported the first three instances of paracoccidioidomycosis associated with Addison's disease that were proved by determinations of urinary corticosteroid excretion. He also studied 29 patients with disseminated blastomycosis and found 14 in whom steroid excretion in response to corticotropin was below normal. Of these, two patients had clearly evident Addison's disease. Marsiglia and Pinto reported four cases of blastomycosis with laboratory evidence of adrenal cortical hypofunction, of which adrenal cortical insufficiency was clinically manifest in three. These workers believe that paracoccidioidomycosis is an important cause of Addison's disease in South America, since the disease is common and the disseminated form has a high incidence of adrenal involvement.

**Other Fungus Infections.**—Other fungus infections, including coccidioidomycosis, cryptococcosis and sporotrichosis, produce adrenal lesions. Maloney described an autopsy series of 50 patients with disseminated coccidioidomycosis, 16 of whom demonstrated adrenal involvement and 2 had clinically recognizable Addison's disease. Baker and Haugen studied 20 patients with disseminated cryptococcosis, of whom 3 were found to have adrenal lesions although none had adrenal insufficiency.

#### Metastatic Tumors of the Adrenal Gland

The adrenal gland is a common site of tumor metastasis. Willis found adrenal implants in 9 percent of a series of 500 autopsies on patients with cancer. Primary carcinoma of the lung is especially liable to metastasize to the adrenal. Hill and Wheeler re-

ported that 42 percent of all primary lung cancers produce adrenal metastases, with breast carcinoma being the second most common source of tumor spread to the adrenal (20 percent). Despite the frequency of adrenal involvement by cancer, adrenal insufficiency rarely develops. Hill and Wheeler found only 22 cases of Addison's disease due to metastatic carcinoma in the literature and added one case of their own. They commented that not all of the 22 reported cases were well documented. These investigators speculated that the rarity of adrenal insufficiency in patients with metastatic tumor of the adrenal arises because (1) the symptoms of Addison's disease may be attributed to the primary disease and thus not be recognized; (2) patients with certain neoplastic diseases are treated with corticosteroids—hence adrenal insufficiency does not become evident; and (3) some patients who have wide-spread cancer are not carefully evaluated.

#### Idiopathic Atrophy of the Adrenal Gland

Idiopathic atrophy of the adrenal gland has been recognized as a cause of adrenal insufficiency since Addison described his original group of patients. Recently primary atrophy has been more frequently demonstrated and it is now considered to be the leading cause of Addison's disease. The cause of adrenal atrophy remained an enigma for many years; however, there is now considerable evidence to indicate that it is an autoimmune disorder.

Anderson et al. first postulated that atrophy of the adrenal gland might represent an autoimmune disease after observing that the sera of two patients with idiopathic Addison's disease contained complement-fixing antibodies to adrenal tissue. The sera of patients with tuberculous adrenal insufficiency did not contain antibodies of this type. In support of their hypothesis, Anderson's group found changes in the thyroid and adrenal glands of patients with idiopathic Addison's disease which resembled the histologic appearance of Hashimoto's disease of the thyroid gland. There was lymphocytic infiltration of both thyroid and adrenal glands with loss of normal cellular components as well as eosinophilia of thyroid epithelial cells and adrenocortical cells.

Blizzard and coworkers looked for adrenal antibodies in the sera of 30 patients with Addison's disease using the indirect Coon's technique and found 16 to be positive. As controls, sera from patients with Cushing's syndrome and adrenal hyperplasia were used. None contained antibodies. Of the 16 Addisonian patients with adrenal antibodies, 7 also had antibodies to thyroid tissue. Subsequently, Bliz-



zard and Kyle reported that circulating antibodies, determined by the indirect immunofluorescent technique, were present in the sera of 36 of 71 patients with Addison's disease. Complement-fixing antibodies were found in 24 of 34 (2 were not tested) of these sera. Adrenal antibodies did not react with other tissues; thus organ specificity was demonstrated, but the antibodies were not species-specific. Cell fractionation studies revealed that adrenal antigens were located in mitochondria and microsomes. Circulating antibodies to thyroid tissue were found in the sera of 22 of the 71 patients, but there was no correlation between the presence of thyroid and adrenal antibodies.

An investigation of the frequency of antibodies against adrenal gland, thyroid gland and gastric mucosa in 62 patients with Addison's disease was conducted by Goudie et al. Thirty-five patients who had no evidence of tuberculosis were considered to have idiopathic atrophy of the adrenal. Of this group, 16 (46 percent) had adrenal antibodies demonstrated by the immunofluorescent technique. In only 2 of 27 patients with tuberculosis Addison's disease and none of a series of control patients were adrenal antibodies present. The incidence of gastric and thyroid antibodies was not different in idiopathic and tuberculous Addison's disease when males and females were considered together. However, 11 of 16 females with idiopathic adrenal atrophy had antibodies to gastric or thyroid microsomal antigens, whereas antibodies were found in only 3 of 11 women with tuberculous Addison's disease. This report appears to be the first demonstration of the relationship between idiopathic Addison's disease and the presence of antibodies to thyroid and gastric tissue.

Nerup and coworkers recently observed that 31 of 48 patients (64 percent) with idiopathic Addison's disease had organ-specific adrenal antibodies, but none were found in patients with tuberculosis of the adrenal glands. Of great interest is the finding that 27 of the 48 patients with idiopathic atrophy of the adrenal glands had thyroid antibodies, and that thyroid antibodies occurred in females twice as often as in males.

A detailed clinical and immunological study of 51 patients with adrenocortical insufficiency was presented by Irvine et al. Twelve were classified as having idiopathic adrenal insufficiency, since they had no clinical or radiological evidence of tuberculosis. Twenty-three with classical features of Addison's disease were considered to have probable idiopathic adrenal insufficiency, and 16 were diagnosed as hav-

ing tuberculous adrenal insufficiency. Of the latter, 9 had adrenal calcification and those remaining had clinically evident tuberculous infection. Ten of 12 patients in the idiopathic group and 11 of the 23 with probable idiopathic adrenal insufficiency had adrenal antibodies by the immunofluorescent method, whereas none of 16 patients with tuberculous adrenal insufficiency had such antibodies. All females with idiopathic disease and 11 of 16 women with probable idiopathic adrenal insufficiency had adrenal antibodies, whereas only 1 of 9 males in the two groups demonstrated this finding. Adrenal antibodies were not found in sera of 51 age- and sex-matched controls.

Detection of adrenal antibodies by the immunofluorescent technique demonstrated that the intensity of fluorescent staining was maximal in the zona glomerulosa. There was specific staining of the zona fasciculata and zona reticularis, but this was less than that of the zona glomerulosa. Fluorescent staining was confined to the cell cytoplasm unless antinuclear factors were also present. These investigators confirmed the presence of adrenal antibodies by use of the complement fixation method. They observed a good correlation between immunofluorescence and complement fixation in measuring the presence and titer of adrenal antibodies. Patients with idiopathic and probable idiopathic adrenal insufficiency demonstrated a high incidence of thyroid antibodies (17 of 35). Gastric antibodies, including antibody to intrinsic factor, were also common; 7 of 35 patients in these combined groups had antibody to intrinsic factor.

Two of the patients with idiopathic atrophy studied by Irvine died. At autopsy there was little recognizable adrenocortical tissue present. In some areas there were clusters of lymphocytes and plasma cells and elsewhere the cortical cells were replaced by vascular fibrous tissue. Isolated, small groups of cortical cells could be distinguished; however, they were enlarged and did not appear normal.

The studies reviewed here suggest that idiopathic atrophy of the adrenal is due to an autoimmune disorder. Observations which support this hypothesis are (1) the adrenal has a histologic appearance similar to that of other tissues involved by autoimmune processes, such as round cell infiltration, fibrosis, atrophy and epithelial cell changes; (2) specific antibodies against adrenocortical cells are present; (3) antibodies against other tissues, particularly the thyroid, are often found in idiopathic Addison's disease; (4) similar adrenal lesions can be produced in experimental animals by injection of autologous

adrenal tissue and Freund's adjuvant; and (5) auto-antibodies are formed in certain animals following the injection of adrenal homogenates.

#### Relationship of Addison's Disease to Other Endocrine Disorders

##### Addison's Disease and Hypothyroidism

The syndrome of hypothyroidism and Addison's disease is known by the eponym "Schmidt's syndrome." Schmidt originally described two patients with Addison's disease in whom atrophy and lymphocytic infiltration of the thyroid and adrenal glands were found at autopsy. Although clinical evidence of thyroid insufficiency was not present in these patients, it was postulated that hypothyroidism would have developed if they had not died of adrenal insufficiency. Since the report of Schmidt, a number of examples of associated thyroid and adrenal disease have been described. The early papers brought out several important facts concerning the relationship of disorders of the thyroid and adrenal glands. First, while lymphoid infiltration of the thyroid gland is occasionally seen in tuberculous Addison's disease, it is far more common in idiopathic atrophy of the adrenal gland. Second, diabetes mellitus occurs with increased frequency in patients with hypothyroidism and Addison's disease. Third, some patients with lymphoid infiltration of the adrenal and thyroid glands develop clinical hypothyroidism. Gastineau and Arnold reported 11 cases of myxedema among 538 patients with Addison's disease. The opinion has been expressed that the incidence of myxedema in Gastineau's series is probably falsely low, since patients with idiopathic Addison's disease were not separated from those with tuberculous disease of the adrenal.

Carpenter et al. described the autopsy findings in 24 cases of Addison's disease, of which 16 were due to tuberculosis and 8 to idiopathic atrophy. The thyroid glands of all 8 patients with adrenal atrophy demonstrated extensive infiltration with lymphocytes and plasma cells, and numerous germinal centers were seen. In only 3 of 16 patients with tuberculous Addison's disease were there similar histological alterations of the thyroid gland. While lymphoid infiltration of the thyroid is common in Addison's disease, microscopic sections of the adrenal glands of 28 patients with typical Hashimoto's disease revealed no lesions resembling idiopathic atrophy. Carpenter et al. also presented clinical data on 15 patients with Addison's disease (12 due to idiopathic atrophy, 2 to tuberculosis and 1 to sarcoidosis), all

of whom had at least one other endocrine disorder. Twelve of the 15 had abnormalities of thyroid function and the 3 remaining had goiters. Of the entire group, 2 had been thyrotoxic, 5 demonstrated overt hypothyroidism and in 2, the clinical diagnosis of Hashimoto's disease was made. Furthermore, 8 of the 15 had diabetes mellitus and 2 others had abnormal blood sugar levels after food or glucose ingestion. These investigators concluded that (1) thyroid dysfunction, particularly hypothyroidism, is more common in patients with Addison's disease than in the general population, (2) characteristic lymphoid infiltration of the thyroid gland occurs in many patients with Addison's disease who do not manifest thyroid dysfunction, (3) the incidence of changes in the thyroid gland is greater in females and in patients with idiopathic variety of Addison's disease, (4) adrenal insufficiency generally precedes recognizable thyroid disease, and (5) involvement of the thyroid gland in Addison's disease is not due to adrenal insufficiency nor depressed function of the pituitary gland. Carpenter's group was impressed by the frequency with which antibodies to thyroid and adrenal tissue can be detected in patients with adrenal and thyroid disease and by the presence of antigens in adrenal mitochondria and microsomes. They believe that an autoimmune process is involved, but whether it is the cause or result of the glandular disorders is a question that has not been answered. They also suggested that the definition of Schmidt's syndrome be altered to include diabetes mellitus as well as Addison's disease and hypothyroidism.

##### Addison's Disease and Hyperthyroidism

Adrenal insufficiency and hyperthyroidism occasionally occur in the same patient. Burke and Feldman recently reported the twenty-seventh well-documented case of association of these two diseases. Their review of the literature quoted two large series of patients with Addison's disease in which the incidence of thyrotoxicosis was determined. Of 180 patients with adrenal insufficiency reported by one group, hyperthyroidism was present in 4.4 percent, a frequency which is ten times that found in the general population. The second series contained 538 patients with Addison's disease, of whom 16 (3 percent) had hyperthyroidism. The data indicate that the two diseases occur together more often than would be expected on the basis of chance alone.

Most often, adrenal insufficiency occurs before or at the same time that hyperthyroidism is recognized, but in 8 of 27 cases presented by Burke and Feldman

the thyroid disorder appeared first. It is theoretically simpler to explain occurrence of the two endocrine disorders in the same patient when thyrotoxicosis precedes adrenal insufficiency. Hyperthyroidism leads to increased secretory activity of the adrenal cortex and accelerated degradation of corticosteroid hormones, as evidenced by normal plasma cortisol levels and increased urinary excretion of 17-hydroxycorticosteroids. Thus, a patient with limited secretory capacity of the adrenal glands may develop overt adrenal insufficiency when metabolic processes are stimulated by increased circulating thyroid hormone levels. On the other hand, the appearance of hyperthyroidism and Addison's disease in a single individual is not easily explained when adrenal insufficiency appears first.

The patient reported by Burke and Feldman had serum antibodies to thyroid and adrenal tissue, a finding which suggests that both diseases might be due to an autoimmune process. Thyroid and adrenal antibodies are often present in patients with idiopathic Addison's disease; however, hyperthyroidism is so infrequent that it seems unlikely that association of the two diseases can be explained as an immunological disorder.

#### Addison's Disease and Diabetes Mellitus

Addison's disease and diabetes mellitus occasionally occur in the same patient. Bourne and Howard collected 81 cases from the literature in which both diseases were present. Addison's disease appeared first in 30 patients, while 46 had diabetes before adrenal insufficiency appeared and there were 5 examples of concomitant development of the two diseases. Solomon et al. collected 113 cases of concurrent Addison's disease and diabetes mellitus, of which 15 patients were their own. Diabetes preceded adrenal insufficiency in 63 percent, Addison's disease appeared prior to diabetes in 23 percent and the diseases apparently occurred simultaneously in 10 percent. The frequency of coexistence of the two diseases was greater in males. It is interesting that diabetes mellitus occurs more often in idiopathic than in tuberculous Addison's disease. As mentioned previously, this is also true of thyroid disorders.

Addison's disease and diabetes rarely occur together in children. In 1965, Burke and Emanuel reported a 14-year-old boy with both diseases and were able to find only three other cases in the literature.

The possibility that the occurrence of Addison's disease and diabetes in the same patient may not be

fortuitous was suggested by Carpenter et al., who observed a very high incidence of diabetes among a group of patients with adrenal insufficiency and thyroid dysfunction. However, they did not suggest a common etiology for the two endocrine disturbances, since there was little evidence to support this idea.

#### Addison's Disease, Idiopathic Hypoparathyroidism and Associated Disorders

Several cases of Addison's disease in association with idiopathic hypoparathyroidism have been described. In addition to adrenal and parathyroid hypofunction, most of the patients have had monilial infections of the skin. A number of other diseases have been reported as occurring in combination with hypoparathyroidism and adrenal insufficiency. Kenny and Holliday presented a patient with idiopathic hypoparathyroidism, Addison's disease, superficial moniliasis and Hashimoto's disease in whom serum antibodies to thyroid and adrenal tissue were present. It is of great interest that the patient's sister had hypoparathyroidism and moniliasis but had neither thyroid nor adrenal disease. Hung et al. emphasized the hereditary aspects of Addison's disease in a report of three siblings with this disorder. In one of the three, additional diagnoses of superficial moniliasis, idiopathic hypoparathyroidism and pernicious anemia were also made. Circulating antiadrenal antibodies were present in the two siblings tested, suggesting that an autoimmune process may have caused the adrenal insufficiency. The possibility that polyglandular autoimmunity may account for the simultaneous occurrence of Addison's disease, idiopathic hypoparathyroidism and pernicious anemia was considered, but little evidence was available to support this possibility. Other examples of the concomitant occurrence of pernicious anemia and Addison's disease have been reported, and in some, antibodies to gastric mucosa have been found.

#### Summary

The etiology of Addison's disease has changed in recent years. Tuberculosis, the most common infectious cause of Addison's disease, is not as important an etiological agent as in the past. Several fungus diseases may involve the adrenal glands, although the number of cases of adrenal insufficiency due to these infections is small. Tumors metastatic to the adrenal glands can produce enough tissue destruction to cause adrenal insufficiency. However, this is a



rare cause of Addison's disease, especially when the frequency of tumor metastases to the adrenal gland is considered. Idiopathic atrophy is now the most frequent cause of Addison's disease. There is abundant evidence which indicates that this is the final result of an autoimmune disorder. Approximately two thirds of patients with idiopathic adrenal atrophy have serum antibodies to adrenal tissue, whereas patients with Addison's disease due to other causes rarely have such antibodies. Antibodies to adrenal tissue occur more frequently in women than in men. Patients with adrenal atrophy often have antibodies to thyroid tissue and gastric mucosa as well as to adrenal tissue.

Idiopathic atrophy of the adrenal is occasionally accompanied by other endocrine disturbances, particularly thyroid disorders and diabetes mellitus. In cases of associated adrenal and thyroid disease, the thyroid is infiltrated with lymphoid and plasma cells, and hypothyroidism is common. Addison's disease and hyperthyroidism also occur together more commonly than would be expected on the basis of chance alone. Addison's disease has been observed in association with idiopathic hypoparathyroidism and monilial infections of the skin and, in a few cases, pernicious anemia has also been present.

(The omitted figures and references may be seen in the original article.)

## CONTROL OF A CHOLERA "MINI-EPIDEMIC"

*CDR C. E. Alexander, MC USN \* and CAPT Alan Hunter, MC USAR.\*\**

The opportunity of controlling a cholera outbreak, let alone the chance to treat clinical cholera cases, is rare for U.S. Armed Forces medical officers. The last reported cases of classical cholera in U.S. military personnel occurred in World War II, when 13 persons, either prisoners of war or men living on a substandard diet in western China, had cholera. The last Navy case was that of a boatswain's mate in 1938 who had the misfortune to fall into Hong Kong harbor and swallowed some of the contaminated water; he died a few days later. Some *Vibrio cholerae* have been obtained from U.S. personnel in Vietnam, but no troops have shown findings of classical cholera.

In September 1967, seven cases of cholera occurred in five days among Vietnamese at the U.S. Army Special Forces camp adjacent to the Station Hospital, U.S. Naval Support Activity (NAVSUP-PACT), DaNang. At the time of the outbreak, the personnel in camp consisted of about 100 Americans, a few Australian advisors; several Vietnamese day workers who lived in DaNang, 500 Vietnamese and Montagnard men who comprised the Mike Force, and 115 dependent women and children of the Montagnard troops. The operations of the Special Forces and Mike Force take them anywhere in the northern five provinces of South Vietnam (ICTZ) for a few days to several weeks.

Six patients were Montagnard dependents; the seventh patient was in the Mike Force, a brother of another patient. The dependents lived in different circumstances than in their old village. Tents on a sand dune contrasted with the traditional long house in the lush flora of the mountains. Water came from a trailer (or a polluted well) instead of a stream; the Montagnards could not comprehend why water should not flow continuously and would beat the trailer with sticks when it went dry. Sanitation and personal hygiene, as Americans know them, were virtually non-existent. Flies feasted on feces that littered the sand (despite the presence of privies) and on community cooking utensils that were never washed. Living conditions were very crowded and undoubtedly everyone shared a common pool of infectious organisms. In a disease survey the previous month, most of these people had intestinal parasites; about 15% were carriers of meningococci; 7% had previously undiagnosed malaria.

The clinical treatment of patients followed the principles given in NAVMED P-5052-23/TB MED 138/AFP 161-1-8, *Cholera*: rapid dehydration and electrolyte replacement. Tetracycline was given to hasten recovery. All patients responded rapidly to treatment and all recovered. The Station Hospital pledged any additional assistance that might be needed.

Cholera, like any enteric bacterial disease, is spread from infected persons through direct or in-

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direct contact (food, water, flies, fomites). Its control depends on interrupting or at least reducing the chances of spread. Our approach followed several steps to this end.

First, the Commanding Officer was given a detailed briefing on the diseases, its mode of transmission, its control, and its psychological and political implications. Nothing could have been accomplished and much would have been undone without his understanding of the problem and his authority to execute control measures.

Second, the facts were given to the Inspector-General, Region I of the Vietnamese Ministry of Health. There was a legal obligation to do so: cholera is an internationally reportable disease and quarantine measures can be invoked. There was a professional obligation to prevent, if possible, the spread of the disease into DaNang and the heavily populated surrounding area. Finally, it was hoped that a voluntary, self-imposed quarantine would be acceptable instead of a formal one so that military operations and security would not be hampered. The Inspector-General readily assented and, because of his extensive experience with the disease, was most helpful in advising us.

Third, a sanitation survey was conducted by the Navy Preventive Medicine Unit (PMU), U. S. Naval Support Activity, DaNang, and corrective measures were started immediately. Trash, garbage, refuse, scattered human excrement, and two privies in bad condition were destroyed by burning. Field latrines were installed and guards were placed in the vicinity to assure use. All water was treated to assure potability; access to polluted sources was prevented. Flies were killed by 2% diazinon dust applied by back-pack engine-powered dusters. Through interpreters, the dependents were instructed to practice simple forms of cleanliness. Large quantities of soap were provided by the American Red Cross for this purpose. Organic iodine disinfectant solutions were used lavishly for general cleaning.

Fourth, all personnel at the camp were given cholera immunizations or boosters by hypodermic jet injectors operated by the PMU. While no immediate benefits, other than psychological, could be expected from this crash immunization program, we felt it would be of value in preventing a future outbreak or in limiting the present one if other measures were not completely effective.

Fifth, quarantine measures were established. Camp personnel were restricted to the base. A few of the Mike Force were permitted to buy food in DaNang for dependents, but their movements were carefully

monitored. The first day, we did not appreciate the pride that Mike Force personnel have in their ability to infiltrate guarded perimeters and discovered with dismay that they could "exfiltrate" just as easily. Additional concertina wire was added to the perimeter the next day and the *cordon sanitaire* became effective. The Vietnamese day workers had no contact with patients or the Mike Force area; they brought their own food from home and used treated water and proper latrines; no restriction was placed on their movement. Patients of course, were isolated and terminal disinfection of excreta, etc. was accomplished. U.S. personnel leaving for CONUS or for other countries on R & R were required to have cholera negative stool culture prior to departure on the off chance that one or more might be asymptomatic cholera carriers.

Sixth, recommendations were made for the future. Unless the basic conditions of the dependents' environment were improved permanently, cholera and similar disease could be expected to recur. Plans were made for a plentiful safe water supply, better housing that would more closely simulate that of the normal Montagnard home and adequate fly-free waste disposal. As a long-term project, the need for continued education of the people in the rudiments of personal hygiene and sanitation, within their cultural framework, was stressed.

The source of the cholera outbreak was never determined. Simultaneously with this outbreak, a cholera epidemic was occurring in the city of Hue, about 60 miles north of DaNang. The strain isolated at Hue was not the same as that in the Special Forces camp patients. The last dependent to arrive at the camp prior to the outbreak came three weeks earlier. Our best hypothesis was that one of the Mike Force acquired a subclinical infection while on an extended operation, returned to camp, and subsequently infected one or more dependents.

This miniature epidemic of cholera was easily controlled. It did not have a direct effect on the health of U.S. military personnel. It did have an effect on combined military operations and could have had an enormous effect on relations with the Vietnamese civilian community had it not been checked promptly. The average medical officer in Vietnam is more likely to deal with an outbreak of dysentery among his own personnel than with cholera among the indigenous population. The approach used here, based on the type of disease and its mode of transmission, and executed swiftly with command backing will prove just as useful whatever the epidemic.

## MEDICAL ABSTRACTS

### THERAPY WITH RADIOISOTOPES: A GENERAL SURVEY (EXCLUDING IODINE)

*L. R. Wasserman, MD and J. L. Glass, MD,  
J Mount Sinai Hosp NY 35(1):68-85,  
Jan-Feb 1968.*

The discovery of artificially induced radioactivity in 1934 marked the opening of a new era for the therapeutic exploration and exploitation of radioactive phenomena. In 1938 John Lawrence introduced the first successful use of an artificially produced radioactive material, radioactive phosphorus ( $^{32}\text{P}$ ), for the treatment of leukemia and, subsequently, polycythemia vera. Thirty years have thus elapsed since the first therapeutic use of cyclotron produced radioactive isotopes.

To be of value therapeutically, an internally administered radioisotope must be selectively accumulated and homogeneously distributed in the tissue(s) to be irradiated, as compared to normal tissues, and should have a suitably short biologic half-life and suitable radiation spectrum. In employing radioactive substances, as in other forms of radiation therapy, one must be as conscious of sparing normal tissue as one is of destroying malignant or other target tissue. With the exception of radioiodine, which will not be considered here, and, to a limited degree, radiophosphorus, therapeutically useful selective uptake and retention have not been readily accomplished by the administration of radioisotopes. Many ingenious and resourceful attempts have been and are being made in the search for radioactive agents capable of seeking out neoplastic tissue and inhibiting its growth. Thus far, success has been limited. Nevertheless, isotopes of a variety of elements, in a variety of forms, and administered in a number of different ways have played and continue to play an important role in the therapy of both malignant and nonmalignant disease, as the treatment of choice or as a valuable alternative or useful adjunct.

In 1955 John Lawrence presented a twenty year survey of the use of radioisotopes in the therapy of cancer. The figure is adapted from his paper and has been brought up to date. Almost as many isotopes are no longer used in therapy as have been added to our armamentarium. Nevertheless, important new uses have been found for old isotopes and many advances have been made, particularly in the areas of teletherapy and brachytherapy. Cesium

137 teletherapy sources are playing an increasingly important role in external beam therapy for treatment at short source to skin distances, especially about the head and neck. Interstitial and intracavitary therapy with sealed gamma and beta-emitting sources has made significant progress with the development of cesium 137, iridium 192, tantalum 182 and yttrium 90 as flexible and versatile radiation sources.

In addition to the development of these new isotope sources, many new uses have been found for some of the older isotopes. The restrictions imposed by inadequate selective localization and concentration through metabolic pathways have led to the development of ingenious methods and devices for localizing radioisotopes in and around tumors and other desired target tissues by a number of physical, chemical and mechanical techniques.

### REVIEW OF ASTHMATIC PATIENTS HOSPITALIZED IN THE PAVILION SERVICE OF THE NEW YORK HOSPITAL FROM 1948 TO 1963, WITH EMPHASIS ON MORTALITY RATE

*M. Dworetzky and A. D. Philson, J Allerg  
41(4):181-194, Apr 1968.*

Baldwin and colleagues reviewed records of patients admitted to The New York Hospital with a primary diagnosis of asthma from 1933 to 1948. The present study covers the period from 1948 to 1963, during which time steroids and the more extensive use of antimicrobials have been introduced into the therapeutic regimen. There were 269 patients admitted during the current 15 year period compared to 434 in the earlier 15 year study. In comparison to the earlier series, there was a shorter hospital stay for both pediatric and adult cases, but the difference was most marked with the children. There were 7 deaths in the current series (2.6 percent) compared to 6 (1.4 percent) in the earlier series. The increased mortality in the current series may be more apparent than real and may merely reflect a more seriously ill group of patients in the current study, steroids and antimicrobials having made it possible to manage many patients without the need for hospitalization. Detailed study of the fatal cases in the current series suggested that barbiturates and opiates contributed to fatal termination. Thirty-one



patients received barbiturates, 7 of whom died; 10 received meperidine HCl (Demerol), 2 of whom died; 5 received morphine, 3 of whom died. (Some patients received 2 or more of these drugs.) Epinephrine in the presence of cardiac overloading or in combination with isoproterenol may cause death from arrhythmia. This may have been a factor in one death in this series.

#### ENDOCRINE ASPECTS OF SARCOIDOSIS

*J. L. Winnacker, MD, K. L. Becker, MD PhD, and S. Katz, MD, New Eng J Med 278(8):427-434, Feb 22, 1968 and 278(9):483-492, Feb 29, 1968.*

Some of the endocrine aspects of sarcoidosis have been discussed in separate reports, but never in a comprehensive review. The purpose of this communication is to emphasize the diversity of clinical manifestations that may result from sarcoidosis of the endocrine and genital organs, and to review current concepts of the calcium metabolism in sarcoidosis. The pathogenesis of hypercalcemia and the problems encountered in its diagnosis and treatment are discussed in detail. The present review is based on a survey of the pertinent literature and on the authors' own experience with endocrine disorders in patients with sarcoidosis.

#### SURGERY OF THE HEART AND GREAT VESSELS

*D. C. McGoon, MD, New Eng J Med 278(3):143-148, Jan 18, 1968 and 278(4):194-198, Jan 25, 1968.*

This report attempts to present a concise yet specific and impartial look at a broad area of cardiac surgery today. It cannot be thorough, nor can it be hoped that all authorities will agree with all its parts.

The great pioneering surgeons who progressively developed successful procedures for the palliation and correction of so many cardiac diseases also originated or exploited many concomitant advances in technology, including the methods of extracorporeal circulation and the various types of intravascular prostheses. Clearly, any effort to append references or to give credit to the innumerable contributors to the progress of this great field would be either too voluminous or too incomplete.

Today, it is essential that physicians be aware of the palliative operations and corrective operations that are available for most forms of acquired and congenital heart disease. A classification of diseases of the heart from a surgical point of view is presented in Table 1, along with a designation of the present status of surgical therapy for each disease. Only a brief discussion of the commoner conditions is possible.

## DENTAL SECTION

#### EVALUATION OF THE PROTECTIVE PROPERTIES OF A VARNISH AND A SILICATE LUBRICANT

*LCDR S. Castronovo, DC USN and  
CDR J. R. Goska, DC USN.*

An in vivo comparison of the protective qualities of a varnish (Copalite) and a silicate lubricant (S. S. White) was made on freshly prepared silicate restorations placed in acrylic resin appliances worn in the mouth. The varnish was applied in 3 coats, with 15 to 20 seconds of drying time between coats and a final drying time of 1 minute. Either varnish or silicate lubricant was applied immediately after removal of the plastic strips. The acrylic resin appliances containing the coated or non-coated (control) silicate restorations were worn in the upper anterior mucobuccal fold for 1, 4, 8, or 24 hours. They were

then exposed to 1N potassium permanganate solution for 1 minute, and examined for staining as a means of determining whether the protective coating was still intact. Six or eight preparations were tested at each time interval. Non-coated samples were heavily stained, though resistance to staining was noted with time. Samples coated with silicate lubricant were partially protected initially, but heavy staining showed that this protection was lost within 1 hour. Although samples coated with varnish showed some moderate staining, no heavy staining was noted during the entire test period. It was concluded that varnish will remain on the surface of a silicate restoration in vivo for at least 24 hours, and that it is more effective as a protective coating for freshly prepared silicate restorations than silicate lubricant.

(Abstract of Research Work Unit: MR005.19-6052 by LCDR S. Castronovo, DC USN and CDR J. R. Goska, DC USN.)

### FORAMEN LOCATION AND APICAL POSITIONING OF ENDODONTIC FILLING MATERIAL

*LCDR J. H. Burke, DC USN.*

Ideally, root canal fillings of endodontically treated teeth are terminated at the cementodentinal junction. If this junction cannot be precisely located, it has been the practice to terminate the fillings 0.5 mm. short of the radiographic apex. This procedure does not take into account the variability in location of the foramen, and therefore introduces the danger of overfilling if the foramen is more than 0.5 mm. from the apex. The purpose of this study was to determine the most reliable distance for terminating the root canal filling, as measured from the radiographic apex, to ensure against overfilling. A total of 50 extracted maxillary incisors and cuspids and mandibular cuspids were measured for the distance

between the foramen and the apex. It was found that the foramen was located in the apical center of the root in only 46 percent of the teeth. The mean distance between the foramen and the apex in the other teeth was  $0.74 \pm 0.29$  mm. when measured along the root surface, and  $0.42 \pm 0.22$  mm. when measured vertically. The teeth were mounted in plaster blocks, the root canals were endodontically prepared, and the canals were obturated with silver cones. An attempt was made to place the cones 0.5 mm. short of the apex; however, the final vertical distance from the point of the silver cone to the apex was judged radiographically to be  $0.58 \pm 0.27$  mm. The teeth were then removed and examined for evidence of overfilling, which was found in two cases. Because of variations in foramen location and the degree of preciseness to which one can fill radiographically, it was concluded that root canal fillings should be terminated 0.8 mm. short of the radiographic apex instead of 0.5 mm. to ensure against overfilling.

(Abstract of Research Work Unit: MR005.19-6052 by LCDR J. H. Burke, DC USN.)

## PERSONNEL AND PROFESSIONAL NOTES

### CHANGES TO LENGTH AND CURRICULUM OF DENTAL TECHNICIAN SCHOOLS

The course length for Dental Technician (Basic), Class "A" School has been extended to 16 weeks. Subjects in operating room procedures, casualty treatment, oral hygiene, and radiography have been expanded to better prepare the students for their duties as dental technicians. Additionally, formal training in typing and records preparation have been added to the course.

The course of instruction at the Dental Technician Prosthetic, Class "C" School has been extended to 34 weeks. The additional time will be utilized in training students in the basic skills and procedures of crown and bridge technique.

The current list of volunteers eligible for transfer to the Dental Technician, Prosthetic, Class "C" School and Dental Technician, Repair, Class "C" is nearly depleted.

Qualified personnel are encouraged to submit requests in accordance with Navy Medical Department Formal Schools Catalog (BUMED INST 1500.9 series) and to list the desired course of instruction on their rotation data card.

### REQUESTING MISSING DENTAL RECORDS

The DD Form 877, Request for Medical/Dental Records or Information has been revised. This form provides a convenient administrative procedure for requesting a dental record for personnel who have reported without records. Manual of the Medical Department, Art 23-54 provides information for the utilization of this form.

### DENTAL OFFICERS HONOR THE LATE LIEUTENANT MILLS

The amount of one hundred dollars has been donated by the dental officers of the Third Marine Amphibious Force to endow a chair in the Naval Academy Memorial Stadium in the memory of LT Robert Perry Mills, DC USN, killed November 2, 1967, by mortar fire while serving with the Third Marine Division in Quang Tri Province, Vietnam.

A scholarship fund in memory of LT Mills has also been established at the University of Texas at Arlington, Texas. The fund will be known as the "Doctor Robert Perry Mills, Jr., Memorial Pre-Dental Scholarship Fund." Contributions may be sent to the University of Texas Arlington Foundation.

# NURSE CORPS SECTION

## THE USE OF OUR OWN RESOURCES

*LT VaLaine Pack, NC USN, Naval Hospital,  
Great Lakes, Ill.*

"Help! I need help!" "Where am I going to find time to assist these people?" These were the words I had for my supervisor when she asked me if I could spare the time to teach the dental interns how to properly scrub for surgery. I had just finished showing two GU technicians and two dental technicians how to scrub, gown and glove for surgery. Now the dental department wanted to send down six interns for the same instruction. I felt as if I had been spending more time with people from out of our operating room than I had spent with my own students. Yes, I needed help but where could I get it? What could be done about this problem?

My supervisor and I pondered the question for several weeks. Then she came up with the idea of making our own TV tape on scrubbing, gowning, gloving and setting up for a minor surgical procedure. One of our rooms had a built-in TV camera—perhaps this could be done. Our chief of surgery was asked about the idea and gave his enthusiastic approval.

The biggest problem that we had initially was developing a workable procedure for setting up for a minor surgical procedure. Our operating room staff nurses held many conferences concerning organization of the back table, the proper way to arrange instruments on a mayo tray, etc. Some of our technicians and students were asked for their ideas also. Once we had selected the methods to be used, they had to be tested to be sure they would be functional in our situation. After testing, the necessary revisions were made and an outline of subject matter was presented to the manager of our TV studio. The cast was chosen and finally, the date was set for actual taping. Although we had practiced, we were a bit nervous as we anticipated the making of a video tape.

Even though we had an overhead TV camera in our largest operating room, it was necessary to bring a portable camera, cables, monitors, flood lights and earphones from the TV studio. This created much curiosity among the surgeons. When they found out what we were doing, they had even more suggestions to offer.

The first day of taping required many "takes" of each scene but by the end of the day we had completed about half of the material we felt was needed. Because of an increased work load necessitating constant use of our large operating room, it was several months before we were able to free another day to finish the tape. During the interim we were able to practice our procedures and overcome our nervousness. The second time we taped we didn't feel quite so ill at ease and were able to completely finish the video portion.

The editing was completed in the workroom of our TV studio where the TV technician and I went over the entire tape to decide which scenes to keep and which to discard. After the editing was finished the audio narration was inserted. Thus our tape, "Setting Up for a Minor Surgical Procedure," was completed in August of 1967, just one year after the original suggestion had been made.

By 1968 we had established an On The Job Training Program in our operating room to train operating room technicians. The tape has been a definite asset in teaching the trainees. Thus far we have used this teaching tool for approximately thirty trainees. In addition we have used it in orienting new nurses and technicians on our operating room staff. The ENT instructor has also used the tape in teaching her students. It is felt that by using the tape we can demonstrate the more specific details of the procedure. It has been helpful in stressing the need of a stable standardized method of preparing for a surgical procedure, especially with the turnover of technicians and nurses that we have in our operating room. We now have an instant source of review.



## RESERVE SECTION

### ICAF CORRESPONDENCE SCHOOL COURSES

The Correspondence School of the Industrial College of the Armed Forces directs its educational efforts toward support of the national interest through enhancing the knowledge of military and civilian executives who are or will be engaged in managing key national security programs.

Two courses are offered:

#### 1. National Security Management

Eligibility: Military Officers of all components of the Department of Defense and Coast Guard serving on inactive duty in the grade of Major or Lieutenant Commander or above. Officers of junior grades who are affiliated with an organized reserve program or reserve officers school may be enrolled.

Average completion time for this course is 12 to 15 months.

Reserve Officers not on extended active duty may earn a total of 60 credit points for retention and retirement purposes through successful partici-

pation in the National Security Management study program.

2. Management in the Department of Defense  
Eligibility: Same as National Security Management.

Average completion time is four to six months.

Reserve Officers not on extended active duty may earn 24 retirement points.

Both courses have a selective study program for Lieutenant Colonel and Commander but no credit points have been authorized for this program.

For further information and applications for either of the above courses Reserve Medical Department Officers may apply to the District Medical Reserve Programs Officer in your Naval District or to the following:

Commandant  
Industrial College of the Armed Forces  
ATTN: Correspondence School  
Fort Leslie J. McNair  
Washington, D.C. 20315

## OCCUPATIONAL MEDICINE SECTION

### THE WOMAN AT WORK

*Frank L. Bauer, MD, Pittsburgh, Pa, JOM 10(3):109-113, March 1968.*

The woman at work is not as simple as the title would indicate. The theme is vast, the subjects highly volatile, and their jobs most diverse.

Working women face special problems and these should be examined in the light of the year 1967.

From 1947 to 1964, employed women have increased from 16,900,000 to 25,800,000—an increase of 53%; employed men have increased from 43,300,000 to 48,400,000—an increase of 12%.

It is estimated that by 1980 the U.S.A. population will be 245,000,000, and at that time there will be 101,000,000 men and women workers compared with 77,307,000 in 1965. The women workers will probably show a rise of 41% between 1965 and 1980, compared with an increase of only 27% for men. Part of this rise will be due to the population increase, but it is also estimated that there will be

a further continued rise in labor force participation by adult women.

The changes that have literally propelled increasing numbers of women into the labor force in my opinion are:

1. The past transition of our Nation from an agricultural-based economy to an industry-based economy, and today's further shift toward a service-based economy.

2. The emergence of jobs that need to be filled and which are best filled by women.

3. Greater longevity—especially in women.

4. Women are marrying younger and having the last of their children before age 30.

5. The greater opportunities for education of women. The more education she has, the more likely she is to seek paid employment.

6. The intensifying urban trend of our population.

Prior to World War I, a typical woman worker was about 26 years old and single, whereas in 1965 a typical woman worker was 41 years old, married, and the mother of teenage or grown children.

Today three out of five women workers are married and the participation of mothers in the labor force has substantially increased since 1940.

Children under ten years of age are the greatest single determinant that keep women from entering the labor force. For a conscientious woman with a family, minimum house work will average 30 hours a week and usually exceeds this figure. Today she can both work and run a house; but if the home demands are much more than this minimum, the price in energies, stress, and lack of job loyalty, is high.

The income of the husband is another determinant of labor force participation by the wife. The percentage of working wives is lowest at the two extremes, viz., the poverty level and at upper income levels, and highest in the middle income group.

Today in the United States, the pattern of participation is for the young woman to take a job upon finishing school. She works for a few years until marriage, then withdraws from the labor force for housekeeping and children. Later, when the children are in school or grown, she returns to the labor force.

The 1964 Civil Rights Act, more specifically Title VII, no doubt will have a substantial impact on the employment of women since the law prohibits an employer from any discrimination against qualified female applicants or employees. Although the consequences of this legislation are not fully apparent at this time, it is safe to say that more and more women will be entering the labor force because of Title VII.

The work pattern of women is highly variable. Many women cannot work full-time because of home responsibilities or other reasons. In addition, there are others who would like to work throughout the year but are unable to due to lack of skills or often because such jobs are not available in the community where they live. As a result, women are much more likely than men to be employed part-time throughout the year. In 1964, only 37% of the women in the work force were employed full-time the year around. This contrasts with 66% of all men who were full-time year-round workers.

The industrial physician will find it helpful to learn the characteristics of the women employed by

the organization he serves. Such knowledge will assist in the resolution of health problems, counseling an employee on a private matter, and advising management on a personnel action.

My observations have led me to formulate several profiles of working women as might be seen in a large business office.

First, there is the large group of female workers, age 18 to 25, single or very recently married. They are largely high school or business school graduates. Their entry into the market place is one of adventure and a job is but an interlude to marriage. By and large, their medical problems are conventional, their adaptation to the environment is good, dedication to the job is not intense, and their absenteeism rate is high—these are the facts.

After a period of time, and from this original group, evolve additional types. One is the character disorder type. These are girls who by all natural laws should be destined for marriage but have grown up in a home where some blighting influence has distorted their outlook. These young women are well on their way to developing many personal conflicts. Also in this category is the girl who just lacks the physical attractions to acquire a husband. Absenteeism is not a great problem and few of them are seen in the company medical center.

Another profile is the early returnee to the work force. She is young and she has had an explosive and disastrous experience with a marriage that lasted 24 to 36 months. When you see her, she has an infant child, is in the process of getting a divorce, and seeking reemployment in the same skill category as she worked before marriage.

Of the remainder of those under the age of 25, the largest number are normal young women employed in clerical pursuits. Mostly they are interested in marriage, and the male prospects they meet are young men working at essentially the same levels of skills as their own.

Several profiles have been noted among women over age 30. Although not numerous, one type is the female executive. Often she is the kind of individual that feels little need for men in her life. She has a large inventory of educational and cultural assets that propel her into responsible positions.

Another over-30 type is the working head of the household. She may be single or married and frequently has worked up in her organization and occupies a rather responsible management but not an executive position. Secretly she often has a number of conflicts about working, but these are so well suppressed that she gets along rather well.

Another is the ambivalent homemaker. In a showdown, if she had to choose, she would stay at home. However, she "moonlights" in the labor force to carry home a little more money and to fill an emotional need that her primary job as homemaker does not satisfy. These women have high non-medical absentee rates.

There is yet another type, almost always over 35, who make up for their few numbers by the problems they create for others. The more severe ones might qualify as social psychopaths. These women are often divorcees, usually with one or two teenage children. They had an above average standard of living until their marriage ended. Alimony payments are inadequate for the way they want to live and they feel forced to return to work. Unfortunately, their skills do not bring much more than the minimum wage and, in addition, everything else in their new way of life is a "come down" from their previous status. As a group, they are highly resentful of the world and their luck. Secretly, they hate working and consider themselves to be tragic victims of cruel circumstances that were none of their doing. Some have marginally submerged these feelings and most of the time are utterly charming, whereas others are openly resentful. As a group, they direct a lot of hostility toward their employer and their job. When these women have an occupational accident, and they frequently do, recovery will be protracted. Their absenteeism is among the highest, their insurance costs for sickness excessive, and their work productivity low.

Among the medical considerations relating to working women, the industrial physician should be generally aware of the numerous state laws regarding the employment of women. They concern hours worked, rest periods, night work, meal periods, maximum daily and weekly hours, minimum wages, seating arrangements, weight-lifting limitations, industrial home employment, employment before and after childbirth, to mention but a few. These laws will not be discussed here, but it is important that one have a working knowledge of them.

What about labor turnover rates? Sometimes these can be favorable, especially when modified by a good health maintenance program for the employees. For the most part, however, they are influenced more by the skill level of the job, the age of the worker, and the worker's record of job stability, than by medical considerations.

As to absenteeism, women lose more work days because of acute conditions than do men, but the reverse is true for chronic conditions such as heart

trouble, arthritis, rheumatism, etc. It is believed by many that nonmedical absenteeism is much higher in women than in men.

An alert medical department can aid employee productiveness significantly through decreased worker absenteeism, and it may be that one of the best opportunities to do this is at the time of initial preemployment medical examination. Admittedly, predicting future productiveness at the time of employment is difficult. Yet it should be the hope of the employment selection process.

Recently, I examined this question. The group selected for the study were 200 consecutively-hired young female clerical workers. These employees were chosen because they were a highly homogeneous group and could readily be studied. The criteria of each employee's work performance were the number of scheduled hours of work missed and the number of absences from scheduled work. These criteria were selected because they were obtainable, objective, and free of any subjective bias. And further, irrespective of how proficient a clerical worker is, she cannot very well be productive when absent from work. The observation period for each employee was the first 12 consecutive months following hire.

All applicants were physically examined and medically interviewed. Those not rejected for major medical causes were asked to complete a medical history questionnaire with the responses limited essentially to yes or no factual answers. From this questionnaire, the following characteristics were selected for study as possible indicators of future absenteeism (Chart I).

Chart I

Age

A previous job held for longer than 12 months  
Marital status  
Children  
Miscellaneous medical Rx  
No. of + responses on history sheet  
History of tension  
Gynecologic history  
Taking medicine now  
Organic diseases  
Neuropsychiatric history  
Accidents  
Headaches  
Gastrointestinal

Programmed on a computer, the presence or absence of each of these 14 characteristics for each individual was correlated with that employee's standing as to number of hours of work missed and number of absences from scheduled work. To high-



light differences and to enhance statistical validity, the study group was divided into fourths on the basis of the number of absences from scheduled work, and the best and worst fourths compared.

Comparison of these two extremes showed that the worst one-fourth has almost 11 times more lost-time hours from work than the best one-fourth (132.5 hours not worked in 12 months compared to 12.36 hours). Also, the worst fourth had over eight times as many absences (14.95 absences in 12 months compared to 1.72). This suggests the importance of attempting to identify these individuals at the time of the employment consideration.

Another important fact learned was that, during the first four months, the lost time and absences of these two groups were approximately the same. The differences in the absence pattern began to emerge in the fourth to sixth month of employment. This suggests that four to six months is the optimum period in the employer-employee relationship for supervisors to counsel, discuss, or take any other constructive actions, that will lead to inculcating a better performance pattern in the employee. If the trait is not recognized and timely remedial steps taken, the performance pattern will become deeply fixed and often little else can then be done other than to tolerate it or discharge the individual.

From the correlation of the fourteen characteristics with the unworked hours and absences, it appeared possible to identify the applicant most prone to absenteeism. She will have symptomatic menstrual cramps, a history of indigestion or ulcer-like symptoms, have had previous minor medical treatment or be taking medicine now, and in addition be married and have children.

Conversely, the correlation indicated that the individual with a low rate of absenteeism will probably be the applicant with the fewest of the 14

characteristics and who, in addition, has held a previous job 12 months or longer, has tension headaches, and some history of situational tension.

At first thought, tension headache might appear as an unfavorable indicator. The opposite appears true, however, and it is surmised that the girl who gets a headache when pressure exists is more conscientious than the average and less prone to find small excuses for not reporting for work.

Age over 21 and a history of treatment for anxiety-type neuropsychiatric problems also seem to be favorable indicators. The other factors listed showed no correlation in this study.

Although the study of 200 female office workers involved a relatively small sample, there was sufficient to conclude that certain items of personal and medical history, obtainable from the medical examination at the time of employment, may be indicative of future high absenteeism, and should be worthy of further investigation. Other things being equal, consideration of these factors should assist in attaining the goal of the employment selection process. From this it can be seen that the Medical Department can constructively participate in the selection process and favorably affect absenteeism.

Many facets of the woman at work have not been discussed. It is evident, however, that her increasing entry into the work force is not a temporary phenomenon but rather one that has been brought about by readily understandable changes. Furthermore, the increasing numbers of women in the work force have produced a need for more knowledge of their health and absentee problems. Industrial medicine can significantly contribute toward the resolution of these problems through research and educational programs which, hopefully, will lead to a clearer perspective of woman's capabilities and limitations as workers.

## HEALTH EFFECTS OF AIR AND WATER POLLUTION

*Bertram W. Carnow, MD, and Mark H. Lepper, MD,  
Chicago, Ill, Industr Med Surg 37(4):281-284, Apr 1968.*

### Introduction

The rapid population growth rate, the increased expansion of urban centers with the formation of huge multicity complexes and the rapid growth and development in industry and transportation has cre-

ated serious problems of environmental contamination. In one sense a balance between input of wastes and clearance by natural mechanism is a kind of ecologic homeostasis. This can be either overwhelmed by the volume of substances for which satis-

factory clearing mechanisms exist, or can be disrupted by foreign substances for which natural mechanisms are poorly adapted.

### Air Pollution

Air pollution has been recognized as a nuisance for hundreds of years, but its seriousness as a health hazard began to emerge only in this century as the lungs of urban man became progressively overtaxed by smokes and gases from innumerable coal furnaces and industrial processes, cigarette smoke, and automobile exhausts.

### Mortality Studies

A number of lethal episodes have been documented in areas of high industrial concentration when thermal inversion and stagnation (meteorologic conditions which prevent the dispersion of continuously accumulating pollutants) caused rapid accumulations of these pollutants. These include the Meuse Valley in Belgium in 1930, Donora, Pennsylvania in 1948, and London in 1952 and 1962. In the worst of these, the 1952 London episode, an estimated 6,500 excess deaths occurred over a ten day period. In all of these episodes the very young and the very old were most severely affected as were persons chronically ill with cardiovascular and respiratory disease. While the lethal dose will vary with the nature of the pollutants, an analysis of all the London episodes suggested that levels above 2,000 micrograms of smokes per cubic meter and 0.4 parts per million of sulfur dioxide caused an immediate increase in the death rate.

### Morbidity Studies

Effects of sublethal doses are less well documented. A study in California showed that the introduction of Los Angeles air into a room containing patients with chronic emphysema caused a measurable decrease in ventilatory function as compared to the breathing of clean ambient air. This did not occur with normal individuals under the same conditions.

A study of female workers in five factories of the same corporation located in areas with different pollution levels revealed a significant increase in acute respiratory illness lasting more than seven days in those women working in areas of higher pollution.

A study of London postmen revealed a higher rate of illness and disability among those in Northeast London where pollution levels were the highest in the city as compared to postmen living under the same socioeconomic conditions in other parts of London. During the 1952 episode a higher proportion of deaths was reported in this quadrant of London suggesting the possibility not only that a higher acute dose was present, but that exposure to lower than lethal concentration over a long period of time might have acted as a potentiating factor.

Over 700 cases of severe intractable asthma were found among American military personnel stationed in Kanto Plain, a heavily industrialized complex in the Tokyo-Yokohama area. Named Tokyo-Yokohama asthma, it occurred in many persons who had no previous history of asthma. Most of the patients were completely unresponsive to conventional anti-asthmatic therapy. Removing them from the area resulted in prompt relief of symptoms and, in most cases, cure. Some of the severely affected patients died. Reintroduction into the area of the affected persons resulted in a rapid onset of severe and acute symptoms suggesting some type of sensitization to the pollutants in the area. Other studies suggest increased morbidity in relation to high pollutant levels.

Although cigarette smoking is now regarded as the major cause of bronchogenic carcinoma, air pollution appears to be a significant additional etiologic factor in the incidence of this disease. Since Harting and Hesse's<sup>1</sup> description of lung cancer in large numbers in radioactive ore miners in Schneeberg, it has been recognized that atmospheric contamination could be a source of pulmonary carcinogens. In addition lung cancer was found related to exposure to nickel, chromates, asbestos and other industrial inhalants. While these represent highly localized forms of pollution, the air of highly industrialized urban centers has been found to contain carcinogens in significant quantities, particularly the aromatic polycyclic hydrocarbons. A significantly greater incidence of cancer of the lung in urban as compared to rural cigarette smokers has been documented by a number of investigators.

While many different pollutants are released into the air, the serious offenders appear to be sulfur dioxide from fossil fuels being consumed at an ever increasing rate because of the high demands for power, nitrogen compounds, carbon monoxide and ozone from the 92 million automobile vehicles presently being used in the United States and from lead and hydrocarbons, the latter containing known car-

1. Harting, F. H. and Hesse, W. Der Lungenkrebs, die Bergkrankheit in den den Schneeberger Gruben. Vierteljahrsschr. Gerichtl. Med. u. Offentl. Sanitätsw. (N.S.), 30:102-32, 296-309 (1879).

cinogens also from automobile exhausts. Radioactive materials, including carbon-14 and strontium-90 have also been introduced into the atmosphere as the result of atomic bomb testing, although the rate of introduction has decreased sharply in the past 5 years.

The mechanism of action of many of these substances on the respiratory tract is still poorly understood. It is thought, however, that interference with the mucociliary cleansing apparatus, local irritation of the bronchial mucosa by irritant gases with decreased resistance to bacterial invasion and various immune mechanisms may be related to the pathogenesis of diseases due to or aggravated by air pollution.

#### Water Pollution

Water, even more than air, has served as a repository for every kind of sewage and industrial waste. In addition, this is enhanced by run off of phosphates and nitrates as well as pesticides—the by-product of agriculture. Consumer wastes further add to the pollutants. This has resulted in the loss of water for drinking in some areas and as a recreational facility in many areas. In many streams and lakes the fish population has been eliminated and numerous episodes of fish kills involving millions of fish have been recorded. This has occurred as the result of introduction of chemicals in high concentration, or in lethal combinations (fish, which were able to tolerate fairly high levels of zinc and copper separately, died in huge quantities as a result of these two appearing together at very low levels), or from loss of oxygen in the water.

#### Pollution-Related Epidemics

While typhoid does not appear to be a significant problem in this country, other water-borne dis-

eases have resulted from fecal contamination. The Raritan Bay Clam Beds have all but been eradicated by the huge quantity of sewage brought into the Bay. A number of serious epidemics of hepatitis have been traced to the consumption of clams from this area. In May 1965 a serious epidemic of water-borne *Salmonella typhimurium* cases with three deaths were reported. In Madeira, California, an epidemic of water-borne gastroenteritis occurred causing an estimated 2,500 cases; *Shigella flexneri* Type 3 and *Salmonella heidelberg* were found to be the organism involved.

Methods for dealing with this problem are similar to those relating to air pollution. Industry and communities must achieve levels of pollution reduction consistent with the ability of the water source to handle the amount introduced. In addition, greater and improved sewage treatment facilities must be developed to handle the increase in the amount of sewage.

#### Conclusions

The air and water are able to decontaminate themselves up to a certain pollutant dose rate level. Beyond that point the cleansing mechanisms break down. In order for man to survive he must determine those levels of contamination at which the most susceptible organisms are seriously affected and, based on these levels, must set standards reflecting acceptable pollutant levels. Further studies are needed to elucidate more precisely the mechanism of action of these pollutants particularly with regard to long term effects on health. The continued rate at which the population has increased, the development of high population densities and the massive expansion of industrial production and consumption make these efforts mandatory.

## DEATHS FROM CHLORINATED PHENOXYACETIC ACIDS (2,4-D; 2,4,5-T; MCPA)

*Nat Clearinghouse Poison Contr Cent Bull, Mar-Apr 1968.*

"The most widely used herbicides are 2, 4-D, 2, 4, 5-T; and related compounds. Whether or not these are actually toxic is a matter of controversy."

—Rachel Carson.

There may not be controversy when these chemicals are used as directed around the household or

in agriculture, but the Michigan farmer who developed peripheral neuropathy four days after he repeatedly used his bare hands to unplug a tractor-towed automatic sprayer might dispute this. 2, 4, 5-T was implicated along with poison oak in the illness of two sisters who played for several hours in a yard which had been sprayed heavily a short time



before. The next day both girls had a generalized erythema of the skin, minimal edematous swelling of the oral and vaginal mucous membranes, slight swelling of lips and eyelids, inflammation of the mouth, albuminuria and oliguria.

Upon receipt of a fatal case history due to suicide in a 48-year-old Connecticut man, a review of the Clearinghouse's reports was made. In the past three years, the Clearinghouse has received several reports of peripheral neuritis and skin rash following exposure to these products, in addition to those already cited.

Other symptoms that were associated with the chlorinated phenoxyacetic acid derivatives were: weakness of chest muscles associated with pneumonia and hematuria; lethargy with poor muscle tone; two brothers with ataxia, weakness and urinary frequency; irritability; lethargy; increase or decrease of temperature. Most of the victims that had symptoms had vomited. There was one report of hallucinations after inhalation of 2, 4, 5-T.

2,4-D and its derivatives serve as a base material from which soluble esters and salts are produced. The LD<sub>50</sub> of these products range from 300 to 700 milligrams per kilogram orally.

When the chlorophenoxy herbicides are ingested in single large doses they may produce death. Four cases have been described in the literature and a 5th case has been reported to the Clearinghouse. A Connecticut truck driver in a suicide attempt ingested a cupful of weed killer which was approximately 20% 2,4-D and 40% 2, 4, 5-T. Within an hour, he became nauseated and began to vomit. Approximately one hour after the ingestion he was found in a chair conscious but in a dazed condition. He was admitted to the hospital an hour and a half later, still conscious, but disoriented.

On his second hospital day he was on the hospital critical list because his general condition was getting worse. His temperature was 104° F., his blood pressure 70/50, and although his urinary output was described as good, his BUN had risen from 16 milligrams percent to 48. He was hyperventilating and had basilar rales.

Late in the second day of hospitalization the patient's blood pressure was very low despite large doses of Aramine and a trial on Levophed. He had sinus tachycardia (150), a central venous pressure of minus 3, temperature of 104° F., hyperventilation, blood PH of 7.43, and anuria. He also had a generalized erythema.

The patient developed scattered crepitant rales in the right lung and died of cardiac standstill (no ventricular arrhythmias were noticed) early in the morning of his third hospital day, approximately 46 hours after the ingestion.

This case had several similarities to the case report of poisoning by MCPA (2 methyl-4-chloro-phenoxyacetic acid). Vomiting occurring shortly after ingestion and unconsciousness appearing in a few hours. Both had lowered blood pressure but in the MCPA case it could be maintained with metaraminal. However, none of the neurological symptoms (facial twitching, constricted pupils, decreased tendon reflexes, clonic spasm of limbs) were mentioned in the present case.

Early deaths in animals by large doses of chlorinated phenoxyacetic acid derivatives were attributed to ventricular fibrillation. In delayed deaths, there was a disinclination to move, progressing to rigidity of skeletal muscles (myotonia) and ataxia. The severe cases had progressive apathy, muscular weakness of the hind limbs, paralysis, clonic spasms and finally coma.

Ingestions of these herbicides would warrant careful gastric lavage and symptomatic and supportive therapy. Clinical Toxicology of Commercial Products recommends Quinidine Sulfate or quinine (0.2 grams orally every two hours for the first 10-12 hours) to relieve myotonia, if present, and to suppress ventricular cardiac rhythms. Severe cases may require cardiac monitoring with defibrillation equipment attached to the chest. Fever should be treated using physical methods (cold packs and alcohol sponges) since antipyretics may be ineffective or contraindicated.

# HOSPITAL ADMINISTRATION SECTION

## HOSPITAL ADMINISTRATION NOTES

**Control of Copying Costs.** Numerous articles have been published regarding copying costs. The October 1967 issue of *Hospital Administration Notes* contains one and another appears in the September 1967 *Management Review* which stresses the need for control of copiers to cut costs. It advises that "the system of centralized copying activities with assigned operators permits the closest control, especially in combination with the requirement for supervisory approval on the type of material to be copied and the number of copies to be made". Copier control is also discussed in a market study recently published by Richard E. Hanson & Associates, Management Consultants (Setauket, L. I., N.Y.). This study indicates that some companies achieve effective control of unmanned copiers by use of "Key" operated copiers. It also states that "the big cost reduction opportunity though is centralization of all copying by placing this 'service' activity physically in the duplicating department".

**Outpatient Services Administration.** Various systems, procedures, and concepts are being introduced for evaluation in our hospitals (numerical filing using Social Security numbers, mechanical file equipment, and the embossed Dependent's ID Card for mechanical imprinting), all of which should improve overall administration of outpatient services. An excellent article on this subject is in the October 1967 issue of *Hospital Management*, page 65, describing a central appointment system developed specifically for the outpatient facility at Nav-Hosp Bethesda. Although the system would not adapt to many outpatient services in existing hospitals because of physical plant arrangements, organization, and staffing differences, the article is well worth reading. Some of our other hospitals are using similar basic systems tailored to local requirements. A limited number of copies of the article entitled "Central Appointment System for Outpatient Clinics" are available from the Bureau.

**Maintenance Guide.** A publication, "*Monroe Maintenance Guide*," is available which provides a handy guide to the solution of major building and grounds maintenance problems. Guide may be obtained free from the Monroe Company, Inc., 10703 Quebec Avenue, Cleveland, Ohio 44106.

**New Form.** A new form, NAVMED 6320/6, Anes-

thesia and Surgical Procedures Information Checklist, has been issued. The form promulgated by BUMED NOTICE 6320 of 7 March 1968 is to be used in lieu of SF 522 for active duty military personnel only. SF 522, Authorization for Administration of Anesthesia and for Performance of Operations and Other Procedures, will continue to be used for dependents, veterans or other nonactive-duty military personnel.

**Food Service Fire Hazards.** According to the latest fire prevention statistics, there is a tavern or restaurant fire in the U.S. every 37 minutes. Grease in cooking equipment, hoods and ducts is the greatest danger. This equipment should be cleaned thoroughly and frequently: daily—after each use of cooking equipment; weekly—for hoods and grease filters; and quarterly—for ducts.

Some precautionary measures to be observed:

a. Check exhaust ducts to determine that they discharge directly outdoors, not to another room or attic.

b. Have a double check system to insure that all cooking equipment is turned off at securing time. All electrical units should have functioning pilot lights to indicate when equipment is turned on.

c. Check automatic fire extinguishing systems or hand extinguishers to assure good working order. Their operation should be explained carefully to each employee in the food service division.

d. Train all food service workers to be alert to danger areas. Assure that all personnel know what to do in the event of fire.

e. Enforce good housekeeping rules, particularly in storage areas, at all times. Assure that unobstructed, clearly marked and proper exits are maintained.

f. Enforce "no smoking" rules in storage or locker spaces—have personnel smoke only in designated and safe areas.

g. Check frequently to determine that waste and rubbish are not accumulating anywhere—improve employee work habits and housekeeping practices.

**Training.** LT W. F. Hoss, Jr., MSC USN, Naval Hospital, Key West, Florida, informs that excellent food handling films, film strips, tape recordings and slides are available on a loan, no fee, basis from:

U.S. Department of Health, Education  
and Welfare  
National Library of Medicine  
National Medical Audiovisual Center  
Atlanta, Georgia 30333

All food service officers are encouraged to utilize this service as an adjunct to their planned training program in orientation/indoctrination including control of tray and kitchen waste, patient tray service, modified diet preparation, food production techniques and proper lifting, equipment operation and cleaning methods. These are in addition to the organized food sanitation, supervisory development and fire prevention/fighting training courses.

Yours For The Asking. Free subscriptions to the following monthly magazines are available by writing to the addresses indicated below:

*Hospital & Nursing Home Food Management*

Food Management Publications, Inc.  
Ojibway Building  
Duluth, Minnesota 55802

*Fast Food, the magazine of Restaurant Business*

Fast Food Service, Inc.  
630 Third Avenue  
New York, New York 10017

*Institutions*

Medalist Publications, Inc.  
1801 Prairie Avenue  
Chicago, Illinois 60616

*Food and Equipment PRODUCT NEWS*

Service Industry Communications, Inc.  
347 Madison Avenue  
New York, New York 10017

*Government Purchasing Digest*

Industrial Publishing Company  
812 Huron Road  
Cleveland, Ohio 44115

Food Service Report. The National Restaurant Association, 1530 North Lake Shore Drive, Chicago, Illinois 60610 has released a report titled "Manpower and Education for the Food Service Industry", price \$2.00 per copy.

Food Service Employee Motivation. Appropriate bulletin boards may be used to post employee birthdays so that all may wish them well; hospital newsletters or newspapers should show employees at work. A pictorial organization chart of the food

service division might be posted in a conspicuous place so that all dining room consumers may see who prepares and serves their food.

Ration Data. Ration statistics for the total hospital food service program in the Second Quarter, FY 1968 are as follows: (Source—Food Service Performance Analysis, NAVMED 1412)

Total rations served	1,263,717
Total cost of provisions	\$1,585,828.00
Average cost of ration (raw food or net cost)	\$1.255
Average cost of whole, fresh milk/gallon	\$0.78
Average ounces served of whole, fresh milk/ration	28.00

Percentage of total expenditures for:

Meat, fish and poultry	37%
Whole, fresh milk	13%
All other categories	50%

Average ration cost for hospitals by group

	Net Cost	Gross Cost
Group A (CONUS) 94,000 to 195,000 rations/qtr	\$1.249	\$3.695
Group B (CONUS) 42,000 to 83,000 rations/qtr	\$1.228	\$4.043
Group C (CONUS) 11,000 to 32,000 rations/qtr	\$1.302	\$5.081
Group D (Outside CONUS) 10,000 to 53,000 rations/qtr	\$1.279	

Average % of attached inpatients served	75.0%
Average % of attached staff/support personnel served	57.0%
Average % of modified diets to total inpatients served	17.0%
Average % of total expenditure for supplementary nourishments	2.7%

The gross ration cost (without equipment) for all Naval Hospitals (CONUS) for the second quarter 1968 averaged \$4.045 per ration ranging from a high \$6.306 to a low \$3.125. Food service officers are encouraged to conduct unit productivity studies to compare gross costs of rations served per area of food production.

Workforce Turnover. A recent survey of hospital food service workers revealed the three most frequently given reasons for leaving were: (1) lack



of an organized inservice, growth-type training program, (2) lack of good and proper supervision, and (3) lack of promotional opportunities.

Improving Services. Naval Hospital, Oakland, California has established a highly successful program to assist disabled servicemen "bridge the gap" financially, between the time of discharge from the naval service to the time of receipt of VA benefits. The local Social Security Administration office provides bedside interviews, counseling and assistance with claims forms. This service is conducted once a week and is coordinated through the Patient Affairs and Nursing Service Offices. For further information regarding this program, inquiries should be made to Commanding Officer, Naval Hospital, Oakland, California 94627.

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Recommended Reading. "MEDICARE and the Record Librarian", by Charles V. Letourneau, M.D., *Hospital Management*, February 1968, pages 43-44.

"Fortifying the Hospital's Legal Defense in Malpractice Suits", by Donald H. Eisenberg, *Trustee, Journal for Hospital Governing Boards*, January 1968, pages 7-12.

"Training in Microbiology for the Executive Housekeeper", by Bertha Yanis Litsky, *The Executive Housekeeper*, March 1968, pages 26-30, and 60-64.

"How to Specify Contract Carpeting", *Contract*, March 1968, pages 69-79.

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Hospital Administration Notes are for information only and are not to be released to or discussed with representatives of business or industry.

## EDITOR'S SECTION

### TO THE OFFICERS OF THE MEDICAL SERVICE CORPS

It is with pride and pleasure that I extend my sincere congratulations to you on this 21st anniversary of the establishment of the Navy Medical Service Corps.

All of you who wear the Medical Service Corps emblem have, through the effective utilization of your many and diversified skills and talents, deservedly become a very important component of the Navy Medical Department.

Wherever you are serving, I want you to know that I have complete confidence in your ability to face the future and to discharge the ever-increasing responsibilities you are assigned with the same willingness and determination the officers of your Corps have so ably demonstrated during the past twenty-one years.

To each and every member of the Navy Medical Service Corps, I extend my best personal regards and wish you a HAPPY BIRTHDAY.



R. B. BROWN  
Vice Admiral, MC, USN  
Surgeon General

## ANNIVERSARY GREETINGS TO MSC OFFICERS FROM SECNAV

It is a pleasure to extend greetings and congratulations to each of you on this 21st Anniversary of the Medical Service Corps.

The men and women of your Corps have earned an outstanding reputation for their abilities, devotion to duty, and spirit of service which have contributed so much to the accomplishment of the mission of the Navy Medical Department. The prevention of disease and injury and the care of the sick are of paramount importance in maintaining the effectiveness of our Navy and Marine Corps operations. All of you may take justified pride in that your many and varied skills have been and are a vital part of these functions.

I extend my best personal regards and wishes for a HAPPY BIRTHDAY!

s/Paul R. Ignatius

## BIRTHDAY GREETINGS FROM THE CHIEF OF THE NAVY MSC

On this 21st anniversary of the Navy Medical Service Corps, it is my great pleasure to extend personal greetings and best wishes to all officers of our Corps.

It is very gratifying to me to reflect back and review the accomplishments of so many fine officers who, individually and collectively, have contributed so much to the recognition and fine reputation our Corps has earned during the twenty-one years of its existence. Each of you can take justifiable pride for your part in these contributions.

I am fully confident that you will continue to accept the challenges of the future and that our Corps will continue to grow in stature with each passing year.

To each and every one of you—Happy Anniversary.

s/R. S. Herrmann  
Captain, MSC, USN

## MEETING OF THE SOCIETY OF MILITARY OPHTHALMOLOGISTS

The Society of Military Ophthalmologists will hold its Eighteenth Annual Meeting on 28 October 1968, in the Wabash Room of the Palmer House, Chicago, Illinois, during the week of the American Academy of Ophthalmology and Otolaryngology meeting. The reception preceding the meeting will begin at 6:30 p.m. The President, COL Thomas J. Tredici, will preside over the business meeting for which a very interesting program is being planned.

This Society, formed in 1950, now has a membership of about 350 Canadian and U.S. ophthalmologists, ophthalmology residents, and honorary mem-

bers. Active duty and Reserve ophthalmologists as well as retired military ophthalmologists are eligible for membership. Eligible personnel who are interested may obtain an application for membership by writing the Secretary-Treasurer: MAJ G. D. Hayden, USAFSAM Box 4168, Brooks AFB, Texas 78235, or the bulletin editor, CDR Bernard R. Blais, AFIP (Ophthalmology), Washington, D.C. 20012.

## LEGAL ASPECTS OF PHS MEDICAL CARE

A self-instruction publication titled, "Legal Aspects of PHS Medical Care—A Programmed Instruction Course," was announced by the Health Services

and Mental Health Administration of the Public Health Service. It is a companion piece for use with a reference booklet by the same title.

The material is intended to show legal obligations and barriers that PHS physicians and other medical-health personnel face when they treat patients in facilities of the Public Health Service. However, non-Governmental medical people meet many of the same problems in the private practice of medicine. The two manuals should prove helpful to physicians generally, administrators of all medical facilities, nurses, other providers of medical care, and students of public health.

The programmed instruction format of the new manual is a teaching device that combines explanations and test questions to set the stage for easy learning by busy readers. The author, Eli P. Bernzweig, of the PHS Bureau of Health Services, states that none of the material is intended to give definitive legal advice to solve specific legal problems. Instead, readers are given broad legal considerations involved in the provision of medical care.

Both publications are on sale from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The programmed instruction manual (*PHS Publication No. 1468-A*) is 55 cents. The related reference booklet (*PHS Publication No. 1468*) is 50 cents. Single free copies are available from Public Inquiries Branch, U.S. Public Health Service, Washington, D.C. 20201.—Bureau of Health Services, Silver Spring, Md.

#### ACP FILM: "PORTRAIT OF AN INTERNIST"

The American College of Physicians presents a 29-minute color film on the specialty of Internal Medicine. Produced in cooperation with Merck Sharp & Dohme, the motion picture tells the story of a typical internist and emphasized the skill, knowledge and experience necessary in diagnosing an unusual case.

Prints are available without charge for showing to physicians and to the general public through Sterling

Movies U.S.A., 43 West 61st Street, New York, N.Y. 10023.

#### SOCIETY OF MILITARY ORTHOPAEDIC SURGEONS MEETING

The 10th annual meeting of the Society of Military Orthopaedic Surgeons will be held at Wilford Hall, USAF Hospital, Lackland AFB, San Antonio, Texas, 23-25 September 1968.

LCOL Jack L. Earle, USAF MC, Chief, Orthopaedic Surgery Service, Wilford Hall, USAF Hospital, Lackland AFB, Texas 78236, is Program Chairman and can answer any questions you may have.

Requests to attend the meeting should be addressed via your Commanding Officer to Bureau of Medicine and Surgery (Code 316). Be sure and specify in your request whether you are STAFF or RESIDENT status.

#### NAVAL SCHOOL OF HOSPITAL ADMINISTRATION CURRICULUM CHANGE

Several major changes to the Naval School of Hospital Administration curriculum take place in August. This period marks the beginning of the first Summer session at the School. Serving as an adjunct to the two semester program of forty-two (42) credits, the five week Summer session provides an additional nine (9) semester hours for students attending NSHA. Additionally, elective course work has been incorporated in the curriculum. This has been accomplished within the same time frame with a more evenly distributed course load and improved scheduling between the two semesters. Overall, these changes will increase the number of officers attaining degree status at the time of completion of the School. Inquiries are invited from prospective students who have previously received counselling service from NSHA concerning the effect of the change on their individual programs. Address inquiries to Commanding Officer, Naval School of Hospital Administration, National Naval Medical Center, Bethesda, Maryland 20014.



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